

HEALTH AND SAFETY PLAN

Interim Measures Caps and Covers Installation

Solutia Nitro Site Nitro, West Virginia

Prepared For:

Solutia, Inc.

575 Maryville Centre Drive
St. Louis, Missouri 63166

Prepared By:

Potesta & Associates, Inc.

7012 MacCorkle Avenue, S.E.,
Charleston, West Virginia 25304-1099
Phone: (304) 342-1400 Fax: (304) 343-9031
E-Mail: potesta@potesta.com

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TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Purpose.....	1
1.2	Site Description/Project Information	1
2.0	PROJECT ORGANIZATION AND RESPONSIBILITIES	2
2.1	Project Contacts	2
2.2	Project Organization	3
2.2.1	Project Management and Regulatory Oversight.....	3
2.2.2	Solutia Contractor	3
2.2.3	On-Site Personnel	5
2.2.4	Visitors.....	5
2.2.5	Causes for Immediate Work Stoppage	5
3.0	HAZARD EVALUATION.....	6
3.1	Chemical Hazard Review	6
3.1.1	VOCs.....	7
3.1.2	SVOCs	7
3.1.3	Asbestos	8
3.1.4	Dioxin	8
3.1.5	Other Hazardous Substances Used at the Site/Hazard Communication.....	9
3.1.6	Work Task Hazard Assessment.....	9
3.2	Physical Hazard Review	9
3.3	Biological Hazard Review	12
4.0	WORK ZONES	14
4.1	Exclusion Zone	14
4.2	Contaminant Reduction Zone	14
4.3	Support Zone.....	15
5.0	MONITORING.....	15
5.1	Real-Time Monitoring - VOCs.....	15
5.2	Instrument Calibration	16
5.3	Use of Detector Tubes	16
5.4	VOC Air Monitoring Action Levels.....	16
5.5	Real-Time Monitoring - Dust	17
5.6	Air Monitoring Action Levels – Dust.....	18
5.7	Personal Air Sampling	18
6.0	WORKER PROTECTION	18
6.1	PPE Use and Limitations	19
6.2	PPE Training and Proper Fitting.....	19

7.0	DECONTAMINATION	20
7.1	Equipment Decontamination	21
8.0	TRAINING, EDUCATION, AND COMMUNICATION	21
9.0	RECORD KEEPING AND HAZARD ANALYSIS	22
10.0	FIRST AID AND MEDICAL ASSISTANCE	22
10.1	Personal Injury/Emergency First Aid	22
10.2	General First Aid Practices	22
10.3	Emergency Information	23

TABLES

Table 1: Exposure Limit and Other Properties of Principal Constituents of Concern

Table 2: Task-Specific Hazard Assessment

- Proposed Initial Levels of Protection
- Air Monitoring Requirements

FORMS

Health & Safety Plan Acknowledgement Form
Daily Safety Briefing Log
Incident Form

HEALTH AND SAFETY PLAN

INTERIM MEASURES CAPS AND COVERS INSTALLATION

Solutia Nitro Site Nitro, West Virginia

1.0 INTRODUCTION

1.1 Purpose

Potesta & Associates, Inc. (POTESTA) has developed this Health and Safety Plan (HASP) in accordance with generally accepted industry work practices, including certain sections of United States Code of Federal Regulations, Title 29, Parts 1910.120 and 1910.1200 (29 CFR 1910.120 and 1910.1200). This HASP has been developed in conjunction with the Interim Measures Caps and Covers Work Plan to establish site-specific policies and procedures to maintain safe working conditions for personnel working on this project. Field work associated with this project will be performed within the limits of the Solutia Nitro facility. All work must be performed in accordance with applicable federal, state, and local regulations, including, but not limited to:

- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) - 29 Code of Federal Regulations (CFR) 1910.120, "Hazardous Waste Operations and Emergency Response"; and,
- OSHA - 29 CFR 1926, "Safety and Health Regulations for Construction."

Minimization of potential hazards is a key to any health and safety program. A critical element in controlling potential hazards is planning. This document addresses areas of concern and the methods to be established to minimize the probability of employee injury or chemical exposure during on-site activities. The HASP is based on information available concerning the possible chemical, physical, and biological hazards on the site. As more data concerning the nature and concentrations of constituents of concern become available, this HASP may be modified.

1.2 Site Description/Project Information

Work associated with the installation of this Interim Measure Caps and Covers project will be performed pursuant to the Site Resource Conservation and Recovery Act (RCRA) Corrective Action Permit, I.D. WV039990965 (Permit), Section E.2, "Interim Measures." The Work involves construction of caps and covers over almost the entire Site, including clearing, stabilization and covering with rip-rap approximately 2500 linear feet (LF) of riverbank along the Process Area boundary with the Kanawha River. In addition, the Work includes installation of a cap over the 2.8-acre western parcel of the West Virginia Alcohol Beverage Control Administration (WVABCA) property. The Work will be performed over a multi-year construction period beginning in April/May of 2011 and completion currently projected to occur

in early 2015. Different types of caps and covers are proposed for different areas of the site, with technical description for each type detailed in the Interim Measures Caps and Covers Work Plan.

2.0 PROJECT CONTACTS, ORGANIZATION AND RESPONSIBILITIES

2.1 Project Contacts

Solutia Project Manager: Mr. Mike House
Manager, Remedial Projects
Solutia Inc.
675 Maryville Centre Drive
St. Louis, Missouri 63141
Telephone: (314) 674-6717
Fax: (314) 674-8957
E-Mail: mhous1@solutia.com

POTESTA Project Manager: Mr. Mike Light
Chief Engineer
Potesta & Associates, Inc.
2300 MacCorkle Avenue, S.E.
Charleston, West Virginia 25304
Telephone: (304) 342-1400
Fax: (304) 343-9031
E-Mail: mlight@potesta.com

CAPS and COVERS,
Engineering Design: Mr. Mark Kiser, Chief Engineer
Potesta & Associates, Inc.
7012 MacCorkle Avenue, S.E.
Charleston, West Virginia 25304
Telephone: (304) 342-1400
Fax: (304) 343-9031
E-Mail: dmkiser@potesta.com

CAPS and COVERS,
Riverbank Stabilization: Mr. Mark Sankoff, Chief Engineer
Potesta & Associates, Inc.
7012 MacCorkle Avenue, S.E.
Charleston, West Virginia 25304
Telephone: (304) 342-1400
Fax: (304) 343-9031
E-Mail: masankoff@potesta.com

On-Site Health and
Safety Officer: SSO – to be determined by the Solutia Contractor

Contractor Project
Manager:

To be determined by the Solutia Contractor Manager

USEPA Contact:

Mr. Bill Wentworth
Project Manager
Waste and Chemicals Management Division (3WC23)
USEPA Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
Telephone: (215) 814-3184
Fax: (215) 814-3113
E-Mail: Wentworth.William@epamail.epa.gov

WVDEP Contact:

Mr. Thomas L. Bass
Environmental Resource Specialist
West Virginia Department of Environmental Protection
Division of Land Restoration
1356 Hansford Street
Charleston, West Virginia 25301-1401
Telephone: (304) 558-2508 ext 306
Fax: (304) 558-3998
E-Mail: Thomas.L.Bass@wv.gov

2.2 Project Organization

2.2.1 Project Management and Regulatory Oversight

Mr. Mike House, the Project Manager, represents the owner of the project and is responsible for the overall implementation and coordination of the work plan activities. He is responsible for the project scope of work and will approve all changes and alterations to the intended plan during the completion of the construction work activities. Mr. Bill Wentworth and Mr. Tom Bass will provide regulatory review and oversight for the project.

The Project Manager will be routinely informed and updated by the POTESTA Project Manager. The POTESTA Project Manager and the POTESTA engineers will be responsible for design of the project; implementation of the Work; and oversight of the Work, working on a day-to-day basis with the Solutia Contractor, who will perform the Work.

2.2.2 Solutia Contractor

The implementation of the HASP will be the responsibility of the contractor selected by Solutia (Solutia Contractor). The Solutia Contractor will provide a team with the following minimum responsibilities (Titles may vary):

- Project Manager - The Project Manager is responsible for assuring that all activities are conducted in accordance with the HASP. The Project Manager has the authority to suspend field operations if employees are in danger of injury or overexposure to harmful agents. The Project Manager's responsibilities include:
 - Coordinating the development of a Site-specific HASP for all phases of the project;
 - Ensuring that the appropriate health and safety equipment and PPE are available for project personnel;
 - Ensuring that all personnel have received the appropriate training before they engage in activities that are potentially hazardous;
 - Ensuring that all required personnel have received the required medical examination, testing, and screening before engaging in work activities; and
 - Designating a Site Safety Officer (SSO) and other Site personnel who will assure compliance with the HASP.

- Project Supervisor/Superintendent - The Project Supervisor/Superintendent is responsible for helping to ensure that all Site activities are conducted in accordance with the HASP. The Project Supervisor reports to the Project Manager. The Project Supervisor's responsibilities include:
 - Ensuring that field personnel, subcontractor personnel, and visitors comply with the requirements of this HASP;
 - Notifying the Project Manager of any changes in work conditions or tasks which may require changes to the HASP;
 - Suspending field activities if necessary, and resume activities when appropriate; and,
 - Delegating, if necessary and appropriate, some of these responsibilities to other on-Site qualified employees.

- Site Safety Officer - The SSO is responsible for ensuring that all Site activities are conducted in accordance with the HASP. The SSO has direct communication with the Project Supervisor and Project Manager, and reports to the President/Corporate Sponsor. The SSO's responsibilities include:
 - Ensuring that personnel, subcontractor personnel, and visitors comply with the requirements of this HASP;
 - Notifying the Project Manager of any changes in work conditions or tasks which may require changes to the HASP;
 - Suspending field activities if necessary, and resume activities when appropriate;
 - Coordinating safety meetings and daily safety briefings, as necessary;
 - Managing health and safety equipment, including instruments, respirators, gloves, suits, and other PPE, used in field activities;
 - Acting as the Emergency Coordinator at the Site and arrange for emergency response in cooperation with local emergency and health officials;
 - Monitoring conditions during field activities to assure compliance with HASP;

- Monitoring conditions during field activities to determine if more stringent procedures or a higher level of PPE should be implemented;
- Maintaining a log to record conditions, personnel involved in field activities, and other pertinent health and safety data;
- Overseeing the arrangement and execution of personnel and equipment decontamination;
- Controlling visitor, subcontractor, and employee access to hazardous areas; and,
- Delegating, if necessary and appropriate, some of these responsibilities to other on-Site qualified employees.

2.2.3 On-Site Personnel

All contractor, subcontractors and vendors conducting work or making deliveries to the site are responsible for taking reasonable precautions for protecting themselves and fellow on-site workers from injury, conducting only those tasks they can perform safely, and reporting all occurrences and/or unsafe conditions to the SSO. All on-Site personnel and subcontractors will be responsible for the following:

- Becoming familiar with, and complying with, the HASP;
- Attending training sessions to review the HASP and other safety and health information;
- Being alert to identified and non-identified hazards;
- Reporting unidentified hazards to the SSO; and,
- Conducting themselves in a manner that is orderly and appropriate for the Site.

Subcontractors working at the site are responsible for compliance with applicable federal, state, and local statutes, ordinances, facilities policies, and this site-specific HASP.

2.2.4 Visitors

During site activities, visitors and regulatory personnel will be briefed on the hazards present at the site by the SSO. Visitors will be escorted at all times while visiting the work area and will be responsible for compliance with the requirements specified in this site-specific HASP.

2.2.5 Causes for Immediate Work Stoppage

Changes in conditions or events that appear to present a potential hazard or threat to personnel or equipment shall be cause for immediate work stoppage.

3.0 HAZARD EVALUATION

This section outlines the hazards expected during the performance of this project.

3.1 Chemical Hazard Review

The main constituents of concern for the Site in and around areas of the planned slurry wall work include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), asbestos and dioxin. These constituents may be found in site soils, groundwater, sediment or wastes.

- Aniline
- N-Nitrosodiphenylamine
- Total TCDF Dioxin
- Total TCDD Dioxin
- OCDD Dioxin
- Trichloroethylene
- Vinyl Chloride
- Benzene
- Chlorobenzene
- 1,4-Dichlorobenzene
- 1,3-Dichlorobenzene
- 1,1-Dichloroethylene
- Ethylbenzene
- Isopropylbenzene
- Toluene
- Cis-1,2-Dichloroethene
- o-Xylene
- m,p-Xylene
- Carbon Tetrachloride
- Naphthalene
- 2,4,6-Trichlorophenol
- Tetrachloroethene

In addition to the chemicals listed above, raw materials known to have been used at the Site include, but may not be limited to:

- Chlorine
- Cyclohexylamine
- Hydrogen peroxide, 20-40%
- Tertiary butylamine
- Carbon disulfide

- Liquid caustic soda, 50%
- Toluene
- Hydroquinone
- Isoamylenes
- Nitrosomorpholine
- 2-Ethylhexylacrylate
- Ethylacrylate

There is a potential for site workers to be exposed to these chemicals during site activities, but especially during soil disturbance/excavation associated with utility abandonment, clearing and grubbing, and excavation of storm water collection and retention areas. In order to protect site personnel from exposure, appropriate personal protective equipment (PPE) will be provided to all workers upon entrance to the work area(s). In addition, equipment and personnel decontamination will be performed at the exits from the work area(s).

A summary of health hazard data is given in the following sections. Table 1 presents exposure limits and other properties of certain chemicals that may be present at this Site.

The main route of exposure for Site chemicals is skin/eye contact and absorption; a second route of exposure is inhalation of vapors/dust during intrusive work activities. Incidental ingestion is also a possible route of exposure. Potential exposures will be reduced or eliminated by following the work practices and using the PPE designated in this HASP.

3.1.1 VOCs

The VOCs found on site may irritate skin on contact and irritate the respiratory tract on inhalation. Eye contact may cause eye irritation, burning and inflammation. Ingestion may result in nausea, vomiting, abdominal pain, rapid pulse, respiratory distress and shock. Absorption into the body systems by any route may cause trouble breathing, dizziness, headache, nausea, vomiting, salivation, and convulsions. Overexposure by inhalation may cause drunkenness, drowsiness, lack of coordination, tremors and restlessness, and an increase in heart rate and blood pressure. Chronic or long-term effects of overexposure to site constituents may cause dermatitis, and cancer of the liver, kidneys, and respiratory tract.

Many VOCs may be present in site soils and waste; however, VOCs with higher concentrations in soils and wastes that may be of particular concern include trichloroethylene, benzene, ethylbenzene, toluene and xylenes.

3.1.2 SVOCs

Primary entry routes into the body for SVOCs are inhalation, ingestion, and skin contact. These materials generally pose less of an inhalation hazard than VOCs because they are less likely to volatilize. However, SVOCs can be a potential constituent of airborne dust and pose an inhalation hazard. Inhalation of certain SVOCs may irritate the respiratory tract. Eye contact may cause eye irritation, burning and inflammation. Immediate or acute effects from short-term

skin exposure to many SVOCs include irritation; burning, itching, redness, skin color changes, and rashes from skin contact.

Photosensitization, a tendency to sunburn more easily or a worsening of rash with exposure to sunlight may occur with skin contact to certain SVOCs. If dust which contains SVOCs contacts the skin minor burning and irritation may result, especially with exposure to sunlight. Wash any exposed skin, apply sunscreen (SPF 30), and cover the area with clothing. Skin contact and exposure during Site activities can be eliminated by the use of proper gloves and PPE clothing to protect areas of exposed skin.

Many SVOCs may be present in Site soils and wastes. However, a SVOC with higher concentrations in soils that may be of particular concern is N-Nitrosodiphenylamine.

3.1.3 Asbestos

Asbestos was used in building, piping, and insulation materials used at the Site and is found in some Site soils, abandoned utilities, and waste. The potential for exposure to asbestos is low except along the river bank – where asbestos containing materials are known to exist. The SSO must evaluate all work areas that contain debris and piping for the presence of asbestos containing materials and take appropriate precautions as necessary. Nose, throat and skin irritation are possible upon exposure to high airborne concentrations of asbestos. Long-term, high levels of airborne exposure may cause asbestosis (fibrosis or scarring of the lung), lung cancer, mesothelioma (cancer of the lining of the lung and /or abdomen), and pleural plaques (thickening of the lung's lining) which develop many years after exposure.

3.1.4 Dioxin

The facility produced an herbicide (2,4,5-Trichlorophenoxyacetic Acid) from 1948 until 1969. A byproduct of this production process was dioxin (specifically 2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD) which has been found in Site soils and wastes. Dioxin concentrations at the Site are low (generally in the 1-5 ppb levels) with some notable exceptions in specific areas associated directly with the 2,4,5-T manufacturing operations. Dioxin compounds have a very low solubility in water. The primary entry routes into the body for dioxin compounds are inhalation and ingestion. *The control of fugitive dusts during all construction related activities is important in minimizing exposures to dioxins at the site.*

Acute health effects of overexposure to dioxin include irritation of the skin and eyes, headache, weakness, dizziness, nausea and vomiting. Exposure to high concentrations of dioxin or exposure over a long period of time can cause a skin condition called chloracne, reproductive effects, cancer, liver damage, and nervous system damage.

No occupational exposure limits have been established for dioxin. The National Institute for Occupational Safety and Health recommends that exposure be limited to the lowest feasible concentration.

3.1.5 Other Hazardous Substances Used at the Site / Hazard Communication

A list of hazardous chemicals and Material Safety Data Sheets (MSDSs) for hazardous chemicals used at the Site by Solutia's Contractor or sub-contractors will be kept at the Site in the Contractor's office trailer, under the care and responsibility of the SSO. All containers of hazardous substances must be labeled with the name of the chemical and appropriate hazard warnings. Employees and contractors who use hazardous substances must read the labels and know where MSDSs are located in case of an emergency. Personnel that will handle these chemicals must be familiar with the hazards associated with them. Individuals that are not familiar with the hazards should notify their superior so that they may be properly informed.

3.1.6 Work Task Hazard Assessment

Table 1 presents exposure limits and other properties of certain chemicals that may be present at this Site. More information concerning the health effects of Site chemicals can be found in the Material Safety Data Sheets (MSDS). **Table 2** summarizes the known potential chemical hazards associated with Site work tasks, a relative hazard assessment, proposed initial levels of personal protection, and air monitoring requirements.

3.2 Physical Hazard Review

The following physical hazards may be encountered at the site during this project:

Underground Utilities and Piping

Miss Utility of West Virginia must be contacted at least 72 hours in advance any planned intrusive activities. It should be noted that this site formally housed a chemical production facility and as a result the buried utilities were abandoned in-place and were not removed during the demolition efforts.

Noise

The use of hearing protection will be required at certain times due to prolonged activities involving equipment that is noisy.

Vehicles/Traffic

Vehicle access to the site is limited to two specific gated entrances. These gates should be closed and locked immediately following daily activities. Site personnel, subcontractors, and visitors are expected to drive with caution while onsite, keeping speeds to a minimum and must be aware of other site traffic.

Heat Stress

Heat stress may be of concern during caps and covers construction activities, depending upon the ambient temperature and level of PPE worn. Symptoms of heat stress include fatigue, headache, nausea, chills, clammy skin, and heavy sweating. One or more of the following control measures may be used to help control heat stress:

- Consume adequate liquids to replace lost body fluids. Site workers should replace water and salt lost from sweating; therefore, they should be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Replacement fluids may be a 0.1 percent salt-water solution, commercial mixes such as Gatorade or Quick Kick, or a combination of these and fresh water.
- Establish a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts for workers or earlier/later work schedules.
- Breaks are to be taken in a shaded rest area.
- Employees shall not be assigned other tasks during rest periods.
- Employees shall be informed of the importance of adequate rest, acclimatization, and proper diet in the prevention of heat stress.

Illnesses associated with heat stress are heat exhaustion and heat stroke. Heat exhaustion is characterized by the same general symptoms as heat stress, along with rapid heartbeat, hypotension, lack of coordination, agitation, intense thirst, and hyperventilation. Heat stroke is characterized by exhaustion, confusion and disorientation, hot, flushed, dry skin, and coma.

If a worker feels he/she or a co-worker has the symptoms of heat stroke, the victim should be taken to Thomas Memorial Hospital or another qualified facility, or emergency personnel (911) should be contacted immediately.

Cold Stress

During the winter months cold stress is an occupational hazard, which must be addressed.

- Employees working outdoors in temperatures at or below freezing may be subject to frostbite. Exposure to extreme cold, even for a short time, may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface area-to-volume ratios such as fingers, toes, and ears, are the most susceptible.

- Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:
 - Frost nip or initial frostbite: characterized by sudden blanching or whitening of skin.
 - Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
 - Deep frostbite: tissues are cold, pale, and solid. Deep frostbite is an extremely serious injury.
- Systemic hypothermia is caused by exposure to freezing or rapidly decreasing temperature. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and sometimes rapid cooling of the body to less than 95 °F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities, and finally; 5) death.
- Thermal socks, long cotton or thermal underwear, hardhat liners and other cold weather gear can aid in the prevention of hypothermia.
- Blankets, warm drinks (other than caffeinated coffee) and warm break areas are essential.
- An overall goal is to keep from getting wet. If one does get wet, dry off and change clothes.
- Cold stress training may be appropriate for work at specific sites.
- Because of dangerous or severe temperature and wind conditions, the POTESTA Field Team Leader may suspend operations.

If an on-site worker feels he/she or a co-worker has the symptoms of hypothermia, or frostbite, the victim should be taken to Thomas Memorial Hospital or other qualified facility, or emergency personnel (911) should be contacted immediately.

Manual Lifting

Some on-site activities may require personnel to move large, heavy objects by hand. The human body is subject to severe damage in the forms of back injury and/or hernia if caution is not observed when handling, lifting, or moving these large, heavy objects. General rules workers should follow include:

- Get good footing
- Place feet about one shoulder width apart
- Bend at knees to grasp weight
- Keep the back upright
- Get a firm hold
- Lift gradually by straightening the legs
- If weight is uncomfortable to lift, get help

Puncture Wounds/Lacerations

In the event of a puncture wound or laceration, the victim should receive a tetanus shot if his/her tetanus vaccination is not current; otherwise, a tetanus infection may result. The most common symptoms of tetanus include lockjaw, stiffness of the neck, difficulty in swallowing, and rigidity of the abdominal muscles. Other symptoms include fever, sweating, elevated blood pressure, and episodic rapid heart rate. Less common forms of tetanus can result in localized muscle contractions (in the area of the wound), and ear infections. In some instances, complications can arise from tetanus, which include respiratory, muscle, and vocal cord spasms, broken bones due to prolonged muscle spasms, hypertension, coma, nosocomial infections, pulmonary embolism, aspiration, and in some instances, death.

Munitions

The Solutia Nitro facility is a formerly-used defense site. If munitions are encountered during this project, work should cease and a project representative shall contact the SSO, Project Manager and immediately notify the West Virginia State Police at (304) 746-2100. In the event that potential ordinance is observed, immediately shut all operating equipment down, and move to a safe location. The equipment shall not be moved from the area until the potential ordinance threat has been cleared by trained and authorized personnel.

3.3 Biological Hazard Review

The following biological hazards may be encountered at the site during this assessment:

Snakes

Both venomous and non-venomous snakes may be present at the site. If an on-site worker encounters a snake, the animal should be avoided if possible. If a snake bites an on-site worker, the victim should be taken to Thomas Memorial Hospital or another qualified facility, or emergency personnel (911) should be contacted immediately. If possible, a description of the snake should be provided to hospital personnel.

Poison Ivy/Dermal Hazards

Poison ivy is a woody vine or shrub that is common in this area. The oil on poison ivy contains a chemical (urishol) that can cause a rash with large, fluid filled vesicles, and severe itching that

lasts up to two weeks. Reaction to exposure varies by individual. Poison ivy is identified by its three-leaf clusters. If an on-site worker is unsure whether a plant is poison ivy or any other dermal hazard, it should be avoided. Under no circumstances should the plants be burned, since the toxin can become airborne. If an on-site worker feels that he/she has contacted poison ivy, the affected area should be washed thoroughly with soap and water. If a rash develops, the victim should contact a physician.

Spiders

Spiders may be encountered during site assessment activities. If possible, these animals should be avoided. If an on-site worker feels he/she has been bitten by a venomous spider, the victim should be taken to Thomas Memorial Hospital (directions provided in **Section 9.3**) or another qualified facility, or emergency personnel (911) should be contacted immediately. If possible, a description of the spider should be provided to hospital personnel.

Ticks

Ticks may be encountered during site assessment activities. If possible, these animals should be avoided. Ticks are parasites, which attach to a host and ingest the host's blood before releasing. Ticks can be removed by using tweezers (bent needle nose are best) to grasp the tick around its head, as close to the host's skin as possible, and pull out slowly and firmly. Afterwards, disinfect the area with antiseptic. With most species of ticks, this will be sufficient. However, the deer tick (which is present, though not common in the area of the site) has the ability to transmit Lyme disease. The early signs of Lyme disease include headache, flu like symptoms, a "bull's-eye" rash more than 2 inches in diameter, and swelling and pain in the joints. Symptoms can develop within two days to four weeks of being bitten. If an on-site worker feels that he/she may have contracted Lyme disease, he/she should contact a physician immediately. If possible, a description of the tick should be provided to hospital personnel.

Another disease, which may be transmitted by ticks, is Rocky Mountain Spotted Fever. Early symptoms, which occur two days to two weeks following a bite, include fever, deep muscle pain, severe headache, chills, and upset stomach or vomiting. A red, spotted rash forms around the wrists and ankles, spreading to other parts of the body. If an on-site worker feels he/she may have contracted Rocky Mountain Spotted Fever, he/she should contact a physician immediately.

To prevent encounters with ticks, on-site workers are advised to tuck their pants into long socks, wear light colored clothing, and wear a repellent when working in brushy, wooded, and tall grassy areas. On-site workers are also advised to check themselves for ticks during and following activities in these areas. Encounters with ticks are more common during the spring and summer.

Stinging Insects

Stings from bees, wasps, yellow jackets, or other stinging insects should be treated according to first aid procedures. If the sting victim has an allergic or adverse reaction to the sting, he/she

should be transported to Thomas Memorial Hospital (directions provided in **Section 9.3**) or another qualified facility, or emergency personnel (911) should be contacted immediately.

Chiggers

If a chigger bite is experienced, the bite should be washed thoroughly with soap and water and then a commercial preparation of medication for chigger bites should be applied.

PPE clothing should be inspected for spiders, ticks, stinging insects, and chiggers before being removed.

4.0 WORK ZONES

Portions of the Work are to be performed in areas of the site which are known to contain buried wastes and contaminated soils. In order to reduce the accidental spread of contamination by workers from these contaminated areas to clean areas, work zones for specific types of operations will be designated and the flow of personnel among the zones will be controlled. Established work zones will ensure that personnel are properly protected against the hazards present in their work area(s), work activities and contamination are confined to appropriate areas, and that personnel can be located and evacuated quickly in an emergency. Hazardous waste sites may be divided into as many zones as needed to meet operational safety objectives. The following three designations are commonly used for hazardous waste site work zones:

4.1 Exclusion Zone

The Exclusion Zone (EZ) contains or could contain contamination. Activities restricted to this zone include:

- River bank grubbing and excavation
- Decontamination
- All intrusive activities
- All subgrade preparation activities

4.2 Contaminant Reduction Zone

The Contaminant Reduction Zone is the transition area between the contaminated and clean areas.

Personnel assigned to the Contaminant Reduction Zone may include:

The following activities are conducted in the Contaminant Reduction Zone:

- Decontamination of equipment, Personnel Decontamination Station operators and personnel;

- Emergency response, such as transport for injured personnel, first-aid equipment (such as eye wash and water), containment equipment (absorbent, fire extinguisher);
- Equipment resupply, such as, personal protective clothing and equipment (such as booties and gloves), sampling equipment (such as bottles and glass rods), and tools;
- Worker temporary rest area, including toilet facilities, benches or chairs, liquids, shade and/or shelter. Water and other potable liquids should be clearly marked and stored properly to ensure that all glasses and cups are clean; and
- Drainage of water and other liquids used during decontamination.

The Contamination reduction zone will be clearly demarcated by safety cones and/or caution tape.

4.3 Support Zone

The Support Zone contains the administrative and other support functions essential to site operations.

Facilities located within the Support Zone should be located according to:

- Accessibility (topography, open space available, location of highways and railroad tracks, easy of access for emergency vehicles);
- Resources (adequate roads, power lines, telephones, shelter and water);
- Visibility (line-of-site to activities in the Exclusion Zone);
- Wind direction (upwind of the Exclusion Zone, if possible); and
- Distance (as far from Exclusion Zone as practical).

5.0 MONITORING

Air monitoring is an integral part of the HASP and is used to help determine the appropriate level of protection for field personnel. The SSO is responsible for all air monitoring at the Site. Air monitoring action levels are presented on the next page. The SSO will use these action levels to assist in determining the need to upgrade or downgrade the level of PPE.

5.1 Real-Time Monitoring - VOCs

Real-time monitoring equipment for work where there is a potential for VOC exposure will include a 10.6-volt photo-ionization detector (RAE Systems MiniRAE 2000 or equivalent). Monitoring should be performed in the breathing zone prior to and during intrusive activities and any other activities where there is a potential for exposure to VOCs. If VOCs are consistently detected above background in the work areas, then additional area or personal air monitoring or

sampling may be necessary to identify the VOCs contributing to PID readings. Readings may be recorded in the Site field log or on the health and safety form (Real-Time Monitoring Log).

For any work activity, a sustained (greater than 5 minutes) PID reading in the breathing zone above the levels in the table in Section 7.4 will require vapor suppression or avoidance techniques. If these methods are not feasible or do not reduce the potential exposure below acceptable levels, then employees must upgrade to Level C protection, as necessary.

5.2 Instrument Calibration

Monitoring equipment will be calibrated and checked for proper operation according to the manufacturers' recommendations. Before initiating field activities, background measurements will be obtained with each instrument upwind and away from potential Site influences. Instrument calibrations and background levels will be documented on daily air monitoring logs or in a field log.

5.3 Use of Detector Tubes

Benzene detector tubes should be used to check for benzene if sustained or repeated readings above background are detected with the PID in areas where volatile organics are expected. Benzene-specific detector tubes capable of measuring down to at least 0.5 ppm must be used, e.g., Dräger tube Benzene 0.5/c, 81-01841. Detector tubes should also be drawn periodically if readings on the PID remain above background but initial detector tube readings are negative. Benzene is of the highest volatile organic compound of concern due to this compound being a carcinogen and having the lowest level threshold for exposure limits out of all of the other compounds found onsite.

5.4 VOC Air Monitoring Action Levels

Constituent	Concentration	Location	Response
Total Organics (PID)	Above background to 0.5 ppm	Worker Breathing Zone – Intrusive activities	Monitoring should occur every 5 minutes after initially exceeding background. After 3 consecutive readings, frequency may be reduced to every 15 minutes until reading drops below background or other action is called for.
Total Organics (PID)	0.5 to 5 ppm	Worker Breathing Zone – Intrusive activities	Use detector tubes to check for benzene.
Benzene (detector tube)	0.5 to 5 ppm	Worker breathing zone – intrusive activities	Upgrade to Level C as above. Cartridges are good for only one day.
Benzene (detector tube)	Above 5 ppm	Worker Breathing Zone – intrusive activities	Control source of vapors. If these cannot be controlled stop work and evacuate the area until vapors dissipate. Monitor from a distance.

Constituent	Concentration	Location	Response
Total organic vapors (and benzene below 0.5 ppm.)	5 to 25 ppm	Worker Breathing Zone – intrusive activities	Upgrade to Level C – half or full-face respirator with combination organic vapor and P100 dust cartridges.
Total organic vapors (and benzene below 0.5 ppm.)	Above 25 ppm	Worker Breathing Zone – intrusive activities	If vapors cannot be controlled, stop work and evacuate the area until vapors dissipate. Monitor from a distance.
Total Organics (PID)	Consistently above background.	Worker Breathing Zone – intrusive activities	Arrange for personal air sampling to identify and quantify the potential VOCs.

5.5 Real-Time Monitoring - Dust

When dust generating activities are performed, dust control must be achieved with a combination of work practice and engineering controls. Work practices to control exposure to dust include working upwind when possible, limiting the speed of vehicle travel at the Site, and using care to limit excess dust during construction activities. Engineering controls used may include water spray or other methods to keep dust down.

Monitoring for dust will be conducted prior to and during excavation and other dust generating activities. A portable aerosol monitor will be used to obtain real-time measurements of dust concentrations upwind, downwind, and cross wind of the work activities and in areas representative of the worker's breathing zone. A Personal DataRAM, or similar instrument, will be used for dust monitoring. Personnel work zone and perimeter dust monitoring will be performed and recorded at the start of potential dust generating operations such as excavating and loading/unloading of trucks, and stockpiling of soil and other dust generating activities. Upwind, background concentrations as well as work area and downwind perimeter area monitoring will be recorded before the start of work and at least every 2 hours during dust generating activities. Perimeter dust monitoring, including upwind and background, will be performed by POTESEA.

For any work activity, a sustained (greater than 5 minutes) dust level in the breathing zone above the concentrations in the following table will require additional dust suppression techniques or working upwind of the contamination. If these methods are not feasible or do not reduce the potential exposure below acceptable levels, then employees must upgrade to Level C protection.

Dust measurements will be made following the manufacturer's instructions on instrument operation and maintenance. The complete manufacturer's operations manual will be on-site at all times.

5.6 Air Monitoring Action Levels – Dust

Constituent	Concentration	Location	Response
Dust	Visible	Work zone	If source is site soils, stop work and Control source of dust.
Dust	0 to 3 mg/m ³	Worker's breathing zone	Continue monitoring during work activities. If visible and from site soils, stop work and Control source of dust.
Dust	Above 3 mg/m ³	Worker's breathing zone	Control source of dust. If dust cannot be controlled upgrade to Level C protection.
Dust	Above 1 mg/m ³	Downwind perimeter	Immediately control source of dust. Record actions in field log book.

5.7 Personal Air Sampling

Personal air samples for VOCs will be collected using 3M 3500 or 3520 organic vapor badges and analyzed by NIOSH Method 1500/1501. At least one set of personal air samples will be collected at the breathing zone of workers closest to excavation activities as well as during clearing and grubbing that disturb Site soils, utility relocation or any excavation activities that disturb Site soils. PPE levels of protection may change based upon the results of sampling.

Because of changing site conditions and activities, the SSO will determine when and where personal air sampling will occur.

6.0 WORKER PROTECTION

The specific PPE listed for each level of protection was selected based on the potential respiratory and dermal hazards. The levels of protection which may be utilized during the proposed project activities are as follows:

- Level D (minimum required by all onsite personnel)
 - Hardhat
 - Safety glasses
 - Steel toe boots
 - Standard work clothing (long pants and shirt)
- Level C
 - Full-face air purifying respirator with MSA HEPA filters or equivalent (safety glasses not required while wearing full-face respirator)
 - Hardhat
 - Steel toe boots
 - Standard work clothing (long pants and shirt)
 - Tyvek coveralls and boot covers

- Nitrile inner gloves/chemical-resistant outer gloves (Personnel operating Geoprobe® and handling samples only. Personnel logging but not handling samples – nitrile gloves only.)
- Level B
- Positive pressure self-contained breathing apparatus (SCBA) or supplied-air breathing apparatus (safety glasses not required while wearing full-face respirator)
 - Hardhat
 - Steel toe boots
 - Standard work clothing (long pants and shirt)
 - Tyvek coveralls, hood, and boot covers
 - Nitrile inner gloves/chemical-resistant outer gloves (Personnel operating Geoprobe® and handling samples only. Personnel logging but not handling samples – nitrile gloves only.)

6.1 PPE Use and Limitations

PPE is selected to protect employees from the specific hazards that they are likely to encounter during their work on site. Selection of appropriate PPE is a complex process that must take into consideration a variety of factors. Key factors involved in this process are:

- Hazard identification;
- Potential exposure routes;
- Performance of PPE materials;
- Work tasks to be performed:
 - Durability of PPE;
 - Heat stress and task duration; and,
 - Matching of PPE to work tasks.

The more that is known about site hazards, the easier the job of PPE selection becomes. As more information about site hazards becomes available, the SSO can make decisions to upgrade or downgrade the level of protection to match the tasks at hand. PPE selection, evaluation, and re-selection is an ongoing process.

The following are guidelines for the selection of appropriate PPE. Site-specific information may suggest the use of combinations of PPE selected from the different levels described below as being more suitable to the hazards of the work.

6.2 PPE Training and Proper Fitting

Workers are trained in the proper use and fitting of PPE during the initial 40-hour hazardous waste course. This training is re-emphasized during the annual 8-hour refresher training. In addition, at the start of the project employees are reminded of the proper fitting of PPE for the

tasks to be performed. If respirators may be used during a project workers are also trained according to the OSHA respiratory protection standard, 29 CFR 1910.134.

At a minimum the training points out the user's responsibilities and explains the following, using both classroom and field training when necessary, as follows:

- The proper use and maintenance of selected protective clothing, including capabilities and limitations.
- The nature of the hazards and the consequences of not using the protective clothing.
- The human factors influencing protective clothing performance.
- Instructions in inspecting, donning, checking, fitting, and using protective clothing.
- Use of protective clothing in normal air for a long familiarity period.
- The user's responsibility (if any) for decontamination, cleaning, maintenance, and repair of protective clothing.
- Emergency procedures and self-rescue in the event of protective clothing/equipment failure.

7.0 DECONTAMINATION

Where possible, disposable PPE and tools/sampling tools will be used. Following an inspection for gross contamination, these items shall be removed and placed into a container for proper disposal.

The following procedures shall be followed in the Contamination Reduction Zone upon exiting the Exclusion Zone:

- 1) Equipment/tool drop;
- 2) Boot wash (unless disposable boot covers are used);
- 3) Outer glove wash;
- 4) Boot rinse (unless disposable boot covers are used);
- 5) Outer glove rinse;
- 6) Boot or boot cover removal;
- 7) Outer glove removal;
- 8) Suit removal;

- 9) Respirator removal; and,
- 10) Inner glove removal.

Disposable items should be containerized and reusable items should be decontaminated in the Contamination Reduction Zone. Since the Exclusion Zone/Contamination Reduction Zone are not stationary, workers do not need to decontaminate prior to each movement of these zones.

Upon approval from the Personnel Decontamination Station operator, the worker may exit to the Support Zone. Workers should keep hands away from mouth and face and wash hands before eating, drinking, or smoking.

7.1 Equipment Decontamination

Equipment decontamination will be minimized to the maximum extent possible by reducing the number of equipment pieces that come into contact with contaminated soils and waste. All equipment used in an exclusion zone must be decontaminated before it leaves the Site or is taken into a clean area. Small tools and equipment used in the EZ that become contaminated may be taken to the decontamination area taking care to isolate the tools/equipment from clean materials and equipment. Equipment will be decontaminated using water and biodegradable detergent or other appropriate decontamination methods as recommended by the SSO. Equipment decontamination will be performed on decontamination pads constructed within the exclusion zone (slurry wall alignment). Decontamination water will be collected in bermed low lying areas. Verification that equipment/vehicles leaving the Site have been adequately decontaminated is the responsibility of the SSO.

8.0 TRAINING, EDUCATION, AND COMMUNICATION

Site worker training will comply with 29 CFR 1910.120 and will be certified in hazardous waste operations and emergency response (HAZWOPER), have written documentation of his/her training and experience, and be current with his/her HAZWOPER Refresher training.

Initial Site training

Prior to beginning work at the site, the SSO will provide training on project-specific health and safety requirements to employees involved with site activities. New or replacement employees will be trained prior to their involvement in on-site activities as well. The training will include, but will not be limited to, the following:

- Introduction and scope of work,
- Characteristics and potential hazards of the site,
- PPE: function, care and limitations,
- Decontamination procedures,
- Emergency response, and
- General safety concepts.

Daily Tailgate Meetings

The SSO will conduct tailgate safety meetings at the start of each workday. On-site workers will be required to attend the daily tailgate meetings. Attendance at the tailgate meetings will be documented in the project logbook.

9.0 RECORD KEEPING AND HAZARD ANALYSIS

Near misses, injuries, or illnesses must be reported by the SSO. Injuries, near misses, and illnesses will be evaluated for trends and similar causes. Corrective action will be initiated in response to the evaluation procedure.

The SSO will perform accident investigations, establish causes, and propose corrective action.

10.0 FIRST AID AND MEDICAL ASSISTANCE

10.1 Personal Injury/Emergency First Aid

When first aid is necessary, the Field Team Leader shall be notified immediately.

First aid will be administered to injured personnel, as required, by qualified and trained persons. If trained individuals are not on-site, emergency first aid should not be administered and emergency personnel should be contacted (911) immediately. If an ambulance is not required, escort the victim to Thomas Memorial Hospital or another qualified facility for treatment or another qualified facility, by an ambulance/rescue squad. When possible, decontaminate injured personnel prior to transport. In life threatening situations, however, the injured personnel may be wrapped in a sheet or similar barrier material and POTESEA will notify the treatment facility/emergency staff to prepare them for handling potentially contaminated personnel from the site. An Exposure/Injury Incident Report will be completed and maintained for all incidents/injuries occurring on site during site assessment activities.

Facilities, services and supplies shall conform to good practice standards for the American Medical Association, and 29 CFR 1910.120. First aid kits will consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be maintained by the Field Team Leader and be fully equipped before being sent out and expended items will be replaced as used.

10.2 General First Aid Practices

General first aid procedures are included in this section. These procedures will be administered by qualified and trained personnel. Typical responses may include the following:

- Call for an ambulance, if in doubt.
- Eyes: Irrigate immediately with an approved first aid rinse (if available) and then provide appropriate medical attention.
- Skin: Wash with soap and water. Wash/rinse areas thoroughly, then provide appropriate medical attention.
- Inhalation: Move victim to fresh air at once. If necessary, perform artificial respiration and get medical attention immediately.
- Ingestion/Swallowing: Attempt to identify the item swallowed. Follow first aid procedures and get immediate medical attention. The Poison Control Center telephone number is 1-800-542-6319.

If an ambulance is not required, escort the victim to Thomas Memorial Hospital or another qualified facility for treatment.

10.3 Emergency Information

Emergency telephone numbers for the surrounding area and the nearest equipped hospital have been identified and are listed below. Directions to Thomas Memorial Hospital are also provided.

EMERGENCY CONTACTS

Ambulance Service (Kanawha County EMS)	911
Nitro Police Department	911 or (304) 755-0701
West Virginia State Police	(304) 746-2100
Fire (Nitro Fire Department).....	911 or (304) 755-0701
Thomas Memorial Hospital (Emergency Department).....	(304) 766-3601
Chemical-Oil Spills (National Response Center)	800-424-8802 or 800-642-3074
Centers for Disease Control	(404) 639-2888 (24 hour)
Alcohol Tobacco & Firearms (Explosives Information)	800-424-9555
Poison Control Center.....	(304) 348-4211 (local)
West Virginia Department of Environmental Protection.....	(304) 759-0515

Directions to Thomas Memorial Hospital from the site: Take Route 25 west approximately one mile to Interstate-64. Take Interstate-64 East approximately 9 miles to Exit 54. Turn left off of interstate onto Route 60 West. Go approximately 1 mile. Thomas Memorial Hospital is on the left.

TABLES

TABLE 1

Exposure Limits and Other Properties of Principal Constituents of Concern Solutia Site, Nitro, WV

Chemical Compound	Exposure Limits ^[a]	STEL ^[b]	IDLH ^[c]	Vapor Pressure ^[d]	Ionization Potential ^[e]
Benzene	0.5 ppm	5 ppm	500 ppm	75 mm	9.24 eV
Ethylbenzene	100 ppm	125 ppm	800 ppm	7 mm	8.76 eV
Toluene	50 ppm	NE	500 ppm	21 mm	8.82 eV
Xylene	100 ppm	150 ppm	900 ppm	9 mm	8.56 eV
Trichloroethylene	10 ppm	100 ppm	1,000 ppm	58 mm	9.45 eV
N-Nitrosodiphenylamine	NE	NE	NE	??	NA

Chemical Compound	Carcinogen ^[f]	Skin Exposure ^[g]	LEL/UEL ^[h]	Odor Threshold ^[i]	3M/NIOSH Respirator Selection ^[j]
Benzene	YES	NO	1.2 - 7.8%	8.65 ppm	OV
Ethylbenzene	NO	NO	0.8 - 6.7%	2.3 ppm	OV
Toluene	NO	YES	1.1 - 7.1%	0.16 ppm	OV
Xylene	NO	NO	1.0 - 7.0%	0.324 ppm	OV
Trichloroethylene	YES	NO	8-10.5%	1.36 ppm	OV
N-Nitrosodiphenylamine	NO	YES	NA	NE	N95

NOTES:

- [a] Exposure Limit: 8-hour Time Weighted Average (TWA) from the 2010 Threshold Limit Values of the ACGIH, or OSHA Permissible Exposure Limit (PEL), whichever is lower.
- [b] STEL: Short-Term Exposure Limit denotes a 15-minute average that may not be exceeded.
- [c] IDLH: Immediately Dangerous to Life or Health - Maximum concentration from which one could escape within 30 minutes without a respirator and without experiencing any irreversible health effects.
- [d] Vapor Pressure: From NIOSH Pocket Guide to Chemical Hazards. Water = 0 mm. Above 1 mm is considered volatile; above 100 mm is considered highly volatile
- [e] Ionization Potential: Expressed in electron volts (eV) from NIOSH Pocket Guide to Chemical Hazards. Used to determine type of detector bulb for the PID.
- [f] Carcinogen: "Yes" indicates compound is a confirmed or suspected human carcinogen by NIOSH, OSHA or ACGIH.
- [g] Skin Exposure: "Yes" indicates potential significant exposure through skin and mucous membranes, either by airborne or, more particularly, by direct contact to ambient vapors.
- [h] LEL/UEL: Lower and upper explosive limits. Percent of material needed in air for ignition when exposed to an ignition source.
- [i] Odor Threshold: Air concentration at which most people can smell the chemical.
- [j] 3M/NIOSH Respirator Selection: Type of respirator recommended by the 3M 2010 Respirator Selection Guide or the NIOSH Pocket Guide to Chemical Hazards. SA = Supplied Air (Level B); OV = Organic Vapor Respirator (Level C); N, R, or P 95, 97, or 100 = Dust and mist respirator (Level C).

NA = not applicable

NE = not established

TABLE 2

***Task-Specific Hazard Assessment with
Proposed Initial Levels of Protection and Air Monitoring Requirements
Solutia Site, Nitro, WV***

Task	Chemical Hazard Assessment			Estimated Initial Level of Protection	Real-Time Air Monitoring		Personal Air Monitoring
	VOCs	SVOCs	Other		VOCs	Dust	
Mobilization	LOW	LOW	LOW	D	NO	NO	NO
E&S Controls Installation	LOW-MED	LOW-MED	LOW-MED	D	YES	YES	NO
River bank Clearing and Grubbing	MED-HIGH	MED-HIGH	MED-HIGH	D, possible upgrade to C	YES	YES	YES
Utility Abandonment/relocation	MED-HIGH	MED-HIGH	MED-HIGH	D, possible upgrade to C or B	YES	YES	YES
Excavation for Storm water Collection and Storage facilities	MED-HIGH	MED-HIGH	MED-HIGH	D	YES	YES	Yes
Caps and Covers subgrade preparation	LOW-MED	LOW-MED	LOW-MED	D, possible upgrade to C	YES	YES	YES
Final Caps and Covers Installation	MED	MED	MED	D	NO	NO	NO
Site Mulching and vegetation	LOW	LOW	LOW	D	NO	NO	NO
Demobilization	LOW	LOW	LOW	D	NO	NO	NO

FORMS

Health & Safety Plan Acknowledgment Form

apl

ID

Daily Safety Briefing Log

Briefing Rally Location:

Incident Form

Forward copies of report to Project Manager and Health & Safety Director within 24 hours of the injury or incident.

Injured's Name _____ Sex ____ S.S. No. _____ Birthdate _____
Home Address _____ City _____ State ____ Zip _____ Phone _____
Job Title _____ Employee's B.U. _____ Hire Date _____ Hourly Wage _____

SUPERVISOR

Date of incident _____ Time _____ Time reported _____ To whom? _____
Client name _____ Client address _____ Time shift began _____
Exact location of incident _____ Did employee leave work? ____ No ____ Yes When _____
Has employee returned to work? ____ No ____ Yes When _____
Did employee miss a regularly scheduled shift after the day of the incident? ____ No ____ Yes
Nature of injury _____ Exact body part _____
Medical Attention: _____ None ____ First aid on site _____ Doctors Office _____ Hospital ER _____ Hospitalized
Job assignment at time of incident _____ Project _____ Task _____ Subtask _____
Describe incident _____

What unsafe physical condition or unsafe act caused the incident: _____

What corrective action has been taken to prevent recurrences? _____

Supervisor _____
Print Signature Date

MANAGER

Comments on incident and corrective action _____

Manager's name _____
Print Signature Date

HEALTH AND SAFETY

Concur with action taken? _____ No ____ Yes Remarks _____

OSHA Classification:

____ Incident only ____ First aid ____ No lost workdays ____ Lost workdays ____ Restored activity ____ Fatality
Days away from work _____ Days restricted work _____ Total days charged _____
Coding: A. Injury type or illness ____ B. Injured body parts ____ C. Activity at time of accident ____ D. Injury cause code ____
E. Agent code ____ F. Safety rule violated code ____ G. Accident prevention code ____

Name _____
Print Signature Date

White: Corporate Health and Safety Yellow: Corporate Insurance Pink: Business Unit Manager
CC: General Council's Office of accident involves death, serious injury or substantial property damage.